

International Search Report together with an Amendment and Written Response in the PCT application. The Amendment included replacement pages in which claim 13 was canceled and other of the claims being amended. In any event, such amended claims, if considered, would not result in a total of forty-two (42) claims. The Examiner did not have the application before him at the time of this discussion and applicants advised that in order to attempt to eliminate any issues concerning the claims, claims 1-21 would be canceled and new claims corresponding thereto would be presented. The Examiner indicated that such procedure appeared acceptable and the Examiner would contact the undersigned attorney if any problems were encountered. Accordingly, by the present amendment, claims 1-21 have been canceled with new claims 22-42 being presented, which claims are presented in a format which should be considered to be in compliance with 35 U.S.C. §112.

As noted above, applicants have experienced difficulty in understanding the Office Action and any rejection as set forth therein. The only statement of a ground of rejection appears to be at page 4 of the Office Action in indicating that "claims 1-42 are rejected under 35 U.S.C. §112" and such rejection is not understood, since only claims 1-21 appear to be present in the application. Insofar as such rejection is a proper rejection, applicants submit that such rejection has been overcome by the cancellation of claims 1-21 and the presentation of new claims 22-42 which applicants submit are in compliance with 35 U.S.C. §112.

Applicants note that the last paragraph at page 4 of the Office Action provides in part:

As understood, claims appear to be essentially taught under 35 U.S.C. 102/103 by the numerous "X" and "Y" references as discussed in the PCT.

Applicants submit that such statement is not considered to be a statement of a ground of rejection, in compliance with 37 CFR §1.104. Insofar as the Examiner

intended to set forth a rejection based upon the numerous "X" and "Y" references as discussed in the PCT, applicants note that the Search Report in the PCT application lists seven (7) documents under the category "X" and "Y" which are listed below.

Category "X" and "Y" references in the PCT application are as follows:

- (1) JP 1-109249, A (Kurt Sauerwein)
- (2) JP 63-225153, A (Omron Tateishi Electronics Co.)
- (3) JP 5-107202, A (Hitachi, Ltd.)
- (4) JP 8-2601, Y2 (Meidensha Corp.)
- (5) JP 10-300688, A (Fujimori Kogyo Co., Ltd)
- (6) JP 6-118062, A (Toshiba Corp.)
- (7) JP 4-12258, A (Marktec Corp.)

Applicants are unaware of how the Examiner intends to utilize any one or all of such documents, and applicants note that a written response with regard to such documents was submitted in the PCT application at the time of filing the National Stage indicated as the "Written Response (13 sheets)" and a copy of such document is submitted herewith, noting that the differences between the present invention and such references are clearly discussed therein, and such response is incorporated by reference herein. Again, applicants note that no rejection of claims over the cited art has been set forth in accordance with the requirements of 37 CFR §1.104 and applicants submit that until the Examiner identifies claims and art utilized in rejecting the claims while pointing out how the Examiner is applying the reference to the claimed invention in compliance with 37 CFR §1.104(c), no meaningful response can be presented.

With regard to the rejection under 35 U.S.C. §112, by the present amendment, the format of the claims has been amended to more particularly set forth method steps and apparatus. Applicants note that Fig. 2 of the drawings illustrates an apparatus in accordance with the present invention, with the other

figures and the corresponding description clearly indicating the manner of effecting deficiency inspection in accordance with the claimed invention, as illustrated by the flow charts of Figs. 5, 8, 15 and 17, for example, together with the corresponding description in the specification. For example, Fig. 2 illustrates the utilization of a color video camera 21 which enables obtaining of R, G and B signals and with respect to claim 22, reference is made to Fig. 15, for example, and the corresponding description at pages 18 and 19 of the specification, with respect to utilization of a green (G) signal component of the image acquired by the color video signal. Applicants submit that the other independent and dependent claims find full support in the specification and drawings of this application and in light of the newly presented claims and the format thereof, such claims should be considered to be in compliance with 35 U.S.C. §112, and such claims distinguish over the references cited in the PCT application.

Applicants note that in light of the difficulties experienced with understanding the Office Action dated October 29, 2002, the present submission is a good faith effort to respond to any rejection, as understood, but again note that the Office Action dated October 29, 2002 is, in effect, incomplete and not in compliance with 37 CFR §1.104. Accordingly, based upon the newly presented claims, applicants submit that this application should now be in condition for allowance and should the Examiner consider that the newly presented claims are insufficient under 35 U.S.C. §112 or under 35 U.S.C. 102 or 35 U.S.C. 103, that the Examiner specifically indicate each claim rejected and the reasons therefor in accordance with the requirements for rejecting claims.

As noted above, favorable action in this application is respectfully requested.

To the extent necessary, applicant's petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing

of this paper, including extension of time fees, to Deposit Account No. 01-2135
(520.40381X00) and please credit any excess fees to such deposit account.

Respectfully submitted,

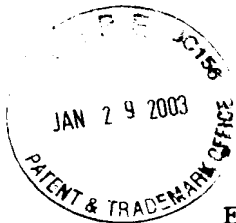
A handwritten signature in dark ink, appearing to read 'Melvin Kraus', written over a horizontal line.

Melvin Kraus

Registration No. 22,466

ANTONELLI, TERRY, STOUT & KRAUS, LLP

MK/cee
(703) 312-6600



Written Response

Examiner of the Patent Office: Mr.Hidehiko Yonezawa, Esq.

1. Designation of the International Patent Application:

PCT/JP99/01676

2. Applicant

Name: HITACHI, LTD.

Address: 6, Kanda Surugadai 4-chome, Chiyoda-ku, Tokyo
101-8010

Nationality: Japan

Address: Japan

3. Agent

Name: Yasuo SAKUTA, Patent Attorney (Reg. No.7509)

Address: C/O HITACHI, LTD., 5-1, Marunouchi 1-chome,
Chiyoda-ku, TOKYO 100-8220 JAPAN

4. Date of Notice: June 29, 1999

5. Content of Response:

RECEIVED
JAN 31 2003
TECHNOLOGY CENTER JAN 28 2000

1. Contents of Written Opinion

The Written Opinion states that claims 1, 3, 5 and 16 do not have a novelty and claims 1 to 21 do not have an inventive step.

The Written Opinion has the following description on the documents.

"As claims 1, 3, 5 and 16 are recited in document 1 cited in the International Search Report, they do not have a novelty.

Claim 2 has no inventive step over documents 1 and 2. It would be obvious for those skilled in the art to use the technique of using a G signal as taught in document 2 in the apparatus of document 1.

Claims 4 and 17 have no inventive step over documents 1, 3 and 4. It would be obvious for those skilled in the art to use the ultraviolet-rays cutting filter as taught in document 3 and the semiautomatic inspection technique as taught in document 4 in the apparatus of document 1.

Claim 6 has no inventive step over documents 1 and 5. It would be obvious for those skilled in the art to use the polarization filter as taught in document 5 in the apparatus of document 1.

Claims 7, 8, 20 and 21 have no inventive step over documents 1 and 6. It would be obvious for those skilled in the art to use the scale as taught in document 6 in the apparatus of document 1.

Claims 9 to 12 have no inventive step over documents

1 and 4. It would be obvious for those skilled in the art to use the semiautomatic inspection technique as taught in document 4 in the apparatus of document 1.

Claims 13 to 15 and 19 have no inventive step over documents 1, 4 and 7. It would be obvious for those skilled in the art to use the semiautomatic inspection technique as taught in document 4 and the penetrant inspection technique as taught in document 7 in the apparatus of document 1.

Claim 18 has no inventive step over documents 1 to 4. It would be obvious for those skilled in the art to use the technique of using a G signal as taught in document 2, the ultraviolet-rays cutting filter as taught in document 3 and the semiautomatic inspection technique as taught in document 4 in the apparatus of document 1.

2. Reason why the present invention should be patented

(1) Gist of the present invention

The present invention relates to a non-destructive inspection method and an apparatus therefor, and the gist of the present invention is as recited in the claims.

(2) Description on the grounds for amendment

The claims have been amended in the Amendment submitted today together with this response. We think that all the amendments do not depart from the scope described in the specification as originally filed.

(3) Description on the documents cited in the Written

Opinion

Document 1: JP,1-109249,A (Kuruto Zauwavain?)

Document 1 relates to a method and apparatus for checking and determining cracks on the surface of a part. Page 4, upper left column, line 8 to upper right column, line 12 describes that a part 1 which undergoes crack identification is moved by a scanning device 2, and is illuminated using a light source in such a way that fluorescent rays emitted from a crack on the surface of the part 1 can be identified by a magnetic-particle method or a color penetrant method using the color TV camera 3 equipped with the objective lens 4 and ray filter.

Document 2: JP,63-225153,A (TATEISHI DENKI KABUSHIKI KAISHA?)

Document 2 relates to a substrate inspection method for inspecting the mount state of a part on a substrate. Page 3, upper left column, line 19 to upper right column, line 7 describes that the level of the R signal in the image signal of the line a which is output from the TV camera 37 becomes higher by the portion of the adhesive 28 and the level of the R signal becomes higher by the portion excluding the portion of the adhesive 28.

Document 3: JP,5-107202,A (Hitachi, Ltd.)

Document 3 relates to a magnetic-particle inspection apparatus, and the second column, lines 33 to 47 describe that the ultraviolet-rays cutting filter is attached to the front face of the TV camera to prevent ultraviolet rays

reflected by a test piece from coming into the camera.

Document 4: JP,8-2601,Y2 (MEIDENSHA CORPORATION)

Document 4 relates to an appearance inspection apparatus for a wire harness. The fifth column, lines 2 to 11 describe that a worker sets inspection areas by using the first input means, the image processing means performs image processing for each inspection area set to automatically determine if there is a deficiency and displays a deficiency determination result, and the worker determines a deficiency from the display contents by observing the wire harness for each of the image processing inspection items that have not passed, and corrects the deficiency determination result by using the second input means if a deficiency is not present.

Document 5: JP,10-300688,A (FUJIMORI KOGYO Co., Ltd.)

Document 5 relates to an optical monitoring apparatus which projects light on a specimen and monitors the color of the specimen, the presence/absence of a deficiency and so forth from the reflected light and transmission light. The second column, lines 9 to 49 describe that an optical monitoring apparatus, which includes a light source for projecting light toward the surface of a specimen and a photodetector for receiving reflected light reflected at the surface of the specimen, has polarizers respectively provided on the light projection side of the light source and the light receiving side of the photodetector, thereby preventing regular reflected light from the irregularity of

the surface of the specimen from entering the photodetector, and monitors the color of the specimen and a deficiency.

Document 6: JP,6-118062,A (TOSHIBA CORPORATION)

Document 6 relates to a deficiency recording/reproducing method for non-destructive inspection which is used to perform non-destructive inspection by a penetrant test or magnetic-particle test or the like. The first column, lines 2 to 18 describe that a scale indicating the two-dimensional coordinates on the test surface of a specimen and this scale and a deficiency indicating pattern are recorded as the same camera image.

Document 7: JP,4-12258,A (MARTEC KABUSHIKI KAISHA?)

Document 7 relates to an aerosol type penetrant, aerosol type cleaner and aerosol type developer which are used in solvent-removing penetrant inspection method. Page 2, upper left column, line 20 to upper right column, line 13 describes a method which performs a process of adhering a solvent-removing dye or fluorescent penetrant to the surface of a specimen, then detects the presence and location of a deficiency through observation under white light when a solvent-removing dye penetrant is used and under ultraviolet rays when a solvent-removing fluorescent penetrant is used.

(3) Comparison between the present invention and cited documents

The subject matter described in document 1 is common to the subject matters described in the present claims in

that a deficiency is detected by detecting fluorescent light from a crack in the surface of a sample by a magnetic-particle method or color penetrant method. But, the subject matter of document 1 differs from the subject matter described in present claim 1 in that document 1 neither describes nor has a description suggesting that in a deficiency inspection method based on a magnetic-particle inspection scheme, "deficiency candidates are extracted from an image acquired by that image pickup, images of said extracted deficiency candidates are displayed on a screen, and a deficiency is extracted from said displayed images of said deficiency candidates". We think that none of the pointed documents 2 to 7 describe or suggest the difference.

The subject matter of document 1 differs from the subject matter described in present claim 3 in that document 1 neither describes nor has a description suggesting that in a deficiency inspection method based on a magnetic-particle inspection scheme, "said to-be-inspected surface irradiated with ultraviolet rays is picked up by a color video camera, and an image acquired by that image pickup is displayed on a screen in a nearly same state as an image acquired by visually observing said to-be-inspected surface irradiated with ultraviolet rays". We think that none of the pointed documents 2 to 7 describe or suggest the difference.

Further, the subject matter of document 1 differs from the subject matter described in present claim 4 in

that document 1 neither describes nor has a description suggesting that in a deficiency inspection method based on a magnetic-particle inspection scheme, "said to-be-inspected surface irradiated with ultraviolet rays is picked up by a color video camera via an ultraviolet-rays cutting filter, a deficiency and deficiency candidates are extracted from an image acquired by that image pickup, and images of said extracted deficiency and deficiency candidates are displayed on a screen". We think that either one of the pointed documents 3 and 4 does not describe or suggest the difference.

Further, the subject matter of document 1 differs from the subject matter described in present claim 5 in that document 1 neither describes nor has a description suggesting that in a deficiency inspection method based on a penetrant inspection scheme, "a deficiency on said to-be-inspected surface is inspected using information about chromaticity and hue of an image acquired by that image pickup". We think that none of the pointed documents 2 to 7 describe or suggest the difference.

Furthermore, the subject matter of document 1 differs from the subject matter described in present claim 6 in that document 1 neither describes nor has a description suggesting that in a deficiency inspection method based on a penetrant inspection scheme, "said to-be-inspected surface illuminated with polarization light is picked up by a color video camera via a polarization filter, and

deficiency candidates are extracted from an image acquired by that image pickup". We think that the pointed document 5 neither describes nor suggests the difference.

The subject matter of document 1 also differs from the subject matter described in present claim 10 in that document 1 neither describes nor has a description suggesting that in a deficiency inspection method based on a probing scheme, "deficiency candidates are extracted from an image acquired by that image pickup by eliminating a pseudo deficiency in said to-be-inspected surface, images of said extracted deficiency candidates are displayed on a screen, and a pseudo deficiency is further eliminated from said displayed images of said deficiency candidates". We think that the pointed document 4 neither describes nor suggests the difference.

Further, the subject matter of document 1 differs from the subject matter described in present claim 11 in that document 1 neither describes nor has a description suggesting that in a deficiency inspection method based on a probing scheme, "deficiency candidates are extracted from an image acquired by that image pickup by eliminating a pseudo deficiency in said to-be-inspected surface, images of said extracted deficiency candidates are displayed on a screen, a deficiency is selected from said displayed images of said deficiency candidates, and information about said selected deficiency is stored". We think that the pointed document 4 neither describes nor suggests the difference.

Furthermore, the subject matter of document 1 differs from the subject matter described in present claim 12 in that document 1 neither describes nor has a description suggesting that a deficiency inspection apparatus based on a probing scheme includes "illumination means which has an ultraviolet-rays illuminating section for illuminating ultraviolet rays onto said to-be-inspected surface of said specimen, and a white-light illuminating section for illuminating white light onto said to-be-inspected surface of said specimen and illuminates said to-be-inspected surface of said specimen". We think that the pointed document 4 neither describes nor suggests the difference.

The subject matter of document 1 further differs from the subject matter described in present claim 14 in that document 1 neither describes nor has a description suggesting that a deficiency inspection apparatus based on a probing scheme includes "magnetic-particle-inspection-originated deficiency-candidate extraction means for extracting magnetic-particle-inspection originated deficiency candidates on said to-be-inspected surface from an image of said to-be-inspected surface acquired by that image pickup by said image pickup means; and penetrant-inspection-originated deficiency-candidate extraction means for extracting penetrant-inspection-originated deficiency candidates on said to-be-inspected surface from said image of said to-be-inspected surface acquired by image pickup by said image pickup means". We think that either one of the

pointed documents 4 and 7 does not describe or suggest the difference.

Further, the subject matter of document 1 differs from the subject matter described in present claim 15 in that document 1 neither describes nor has a description suggesting that a deficiency inspection apparatus based on a probing scheme includes "display means for displaying information of said images of said deficiency candidates stored in said storage section on a screen". We think that either one of the pointed documents 4 and 7 does not describe or suggest the difference.

Furthermore, the subject matter of document 1 differs from the subject matter described in present claim 16 in that document 1 neither describes nor has a description suggesting that a deficiency inspection apparatus based on a probing scheme includes "display means for displaying an image of said to-be-inspected surface acquired by image pickup by said image pickup means on a screen in a nearly same state as an image acquired by visually observing said to-be-inspected surface irradiated with ultraviolet rays". We think that none of the pointed documents 2 to 7 describe or suggest the difference.

Moreover, the subject matter of document 1 differs from the subject matter described in present claim 17 in that document 1 neither describes nor has a description suggesting that a deficiency inspection apparatus based on a probing scheme includes "image pickup means for picking

up said to-be-inspected surface irradiated with ultraviolet rays by said ultraviolet-rays irradiation means by a color video camera via an ultraviolet-rays cutting filter; and deficiency-candidate extraction means for detecting deficiency candidates on said to-be-inspected surface from an image of said to-be-inspected surface acquired by image pickup by said image pickup means". We think that both of the pointed documents 3 and 4 do not describe or suggest the difference.

The subject matter of document 1 further differs from the subject matter described in present claim 18 in that document 1 neither describes nor has a description suggesting that a deficiency inspection apparatus based on a probing scheme includes "deficiency-candidate extraction means for extracting deficiency candidates on said to-be-inspected surface using a green (G) signal component in a color image signal output from said image pickup means". We think that none of the pointed documents 2, 3 and 4 describe or suggest the difference.

Furthermore, the subject matter of document 1 differs from the subject matter described in present claim 19 in that document 1 neither describes nor has a description suggesting that a deficiency inspection apparatus based on a probing scheme includes "magnetic-particle-inspection-originated deficiency-candidate extraction means" and "penetrant-inspection-originated deficiency-candidate extraction means". We think that both of the pointed

documents 4 and 7 do not describe or suggest the difference.

3. Conclusion

As explained above, the individual subject matters described in the present claims differ from the subject matters described in documents 1 to 7 and are not easily devised by those skilled in the art. We therefore think that the present invention sufficiently has a novelty and inventive step.

We respectfully request that the novelty and inventive step of the present invention should be reconsidered based on the scope of the amended claims.